

REMARKS/ARGUMENTS

Applicants respectfully request reconsideration of the application in view the present amendments in the following remarks. By this amendment, claims 1 and 5-9 are amended, and claim 2 is canceled. As a result, upon entry of this amendment, claims 1, 3 and 5-9 remain pending in the application, with claims 1 and 5 being independent claims. It is believed that no additional fees are due for the consideration of this paper. However, if additional fees are due, the Commissioner is authorized to charge such fees to deposit account number 50-3629.

Amendments to the Claims

It is respectfully submitted that the claims as amended above are supported by the application as originally filed in the Patent Office on July 12, 2006, that the amended claims satisfy the written description requirement and the other requirements of 35 U.S.C. § 112, and that no new matter is being added. Claims 1 and 5 are amended to more clearly recite that the drill string is formed from a plurality of drill rods, and that the drill string is driven at least by percussive forces. These amendments are supported by the application as originally filed at least at Figs. 1-3 and the accompanying text at page 4, line 7 through page 5, line 23 wherein a top hammer drill rig 10 uses at least percussive drilling to drill holes with a multiple rod drill string 3. These claims are further amended to incorporate the limitation of claim 2 wherein the survey tool is maintained in a sleeping mode while the drilling is undertaken, and claim 2 is correspondingly canceled. Finally, claims 5-9 are rewritten as method claims performing the recited steps. In view of this, Applicants respectfully submit that the amendments to claims 1 and 5-9 do not present new matter and do not raise new issues, and respectfully request entry of the present amendments and consideration of the claims as amended.

Response to Claim Objections

Claim 1 was objected to for lacking antecedent basis for “each drill rod.” Claim 1 is amended as discussed above to more clearly recite that the drill string is formed from a plurality of drill rods. Claim 5 was similarly amended. Applicants respectfully submit that the independent claims as amended provide appropriate antecedent basis for “each drill rod,” and respectfully request withdrawal of the objection to the claims.

Response to Claim Rejections under 35 U.S.C. §112, Second Paragraph

Claim 5 was rejected as being indefinite for claiming an apparatus but reciting method steps for using an apparatus that do not further limit the apparatus itself. Claims 5-9 are rewritten hereby as method of surveying drill holes comprising the previously-recited method steps. Applicants respectfully submit that claims 5-9 as amended are sufficiently definite method claims, and respectfully request withdrawal of the indefiniteness rejection.

Response to the Rejections under 35 U.S.C. §103

In the Office action, claims 1-3 and 5-9 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,329,647 (Freedman) in view of U.S. Patent No. 3,047,794 (Bennett et al.). Applicants respectfully request withdrawal of the rejection in view of the present amendments to claims 1 and 5 and the following arguments.

As discussed above, claims 1 and 5 as amended recite that the drill string is formed from a plurality of drill rods and is driven at least by percussive forces. In general, the key distinguishing feature of the present invention over all of the cited art is the use of an inertial survey package to determine the position of the drill head at periodic intervals as drill rods are removed from the drill string during retraction of the drilling head after the drilling operation has been completed. Various other survey tools have been used in other drill strings in the past, such as magnetometers and inclinometers, but the use of an inertial survey package has not been considered in the past due to the high probability that the inertial survey package would be destroyed by the vibration in the drilling operation from percussive drills of this nature.

Turning now to the specific matters raised in the final Office action, the Patent Office comments in the second paragraph on page 3 that the Freedman patent teaches that the surveying may be obtained during drilling and that the survey tool include an inertial survey package. The Patent Office relies on the Freedman patent at column 5, lines 26-30 that refers to directional survey data as requiring inertial survey equipment. Applicants respectfully submit that this is an invalid assumption on the part of the Patent Office because apparatus of the type described in the Freedman patent is typically used for drilling in soft rock, such as coal, where it is well known to use other forms of survey packages (typically magnetometers or inclinometers) to obtain the directional survey data. The Freedman patent provides

absolutely no teaching of the use of an inertial survey package, and the inference drawn in the Office action is clearly in hindsight as a result of reading the description in the present patent application.

In paragraph 3 on page 3, the Office action further maintains that the Freedman patent teaches a method of taking surveys at different intervals to determine direction and trajectory, which inherently requires an inertial survey package. Once again, the Patent Office is incorrect in concluding that surveys of this type inherently require an inertial survey package because drilling apparatus of the type taught by the Freedman patent typically use magnetometers or inclinometers to determine direction and trajectory. In order to find that a prior art patent “discloses” a feature, that feature must be either expressly disclosed in the patent or inherently disclosed in the patent. The standard for inherency is strict. Section 2112 of the M.P.E.P. sets forth the standard for inherency as follows:

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993)(reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). >“To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” (underlining original).

Because inertial survey packages are only one of the alternative direction and trajectory measuring devices that may be used in these types of surveys, and is a less likely alternative to be used than other measuring devices, it follows that inertial survey packages are not necessarily present in the method taught in the Freedman patent.

With reference to the Bennett et al. patent, the Office action asserts that the reference teaches using a borehole logging apparatus to take measurements while the drill string is being withdrawn. This may be correct, but what is not recognized in the rejection is that the Bennett patent teaches the use of a post logging tool which is pumped down the hollow drills string after drilling is complete. (*See* Bennett et al. Patent, col. 1, lines 54-62). In this sense,

the Bennett et al. patent does not teach a method of surveying drill holes where the survey tool is disposed within the drill string at the cutting end and advances with the drill string into the borehole while the drill string is operational to drill the borehole as part of the whole drilling operation as defined in claims 1 and 5 of the present application. It is further noted that the Bennett et al. patent also fails to teach the use of an inertial survey tool in general, let alone the use of an inertial survey tool that advances with the drill string as the borehole is drilled with percussive forces driving the drill string. In view of this, Applicants respectfully submit that modifying the Freedman patent in light of the Bennett et al. patent will not result in the invention recited in the amended claims of the present application.

It is also of note that the Office action acknowledges in paragraph 4 on page 3 that the Freedman patent does not teach maintaining a survey tool in a sleep mode during drilling, and then fails to identify any disclosure in the Bennett et al. patent of this limitation. Despite this, claim 2 was rejected in the Office action along with the other claims without any specific analysis of the limitations being provided. The limitations of claim 2 is now incorporated into the independent claims of the application, and it would appear that the claims should be allowable over the proposed combination since the Office action does not show that these limitations are present in the applied references.

CONCLUSION

For at least the foregoing reasons, reconsideration and withdrawal of the rejection of the claims and allowance of the currently pending claims are respectfully requested. Should the Examiner wish to discuss the foregoing or any matter of form in an effort to advance this application toward allowance, Examiner Hutchins is urged to telephone the undersigned at the indicated number.

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Respectfully submitted,

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